

Missouri Department of Natural Resources

## Total Maximum Daily Load Information Sheet

### Town Branch/Piper Creek (or Piper Creek)

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#### Waterbody Segment at a Glance:

**County:** Polk  
**Nearby Cities:** Bolivar  
**Length of impairment:** 0.5 miles  
**Pollutant:** Volatile Suspended Solids (VSS)  
**Source:** Bolivar Wastewater Treatment Facility (WWTF)



State map showing location of watershed

**TMDL Priority Ranking:** High

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#### Description of the Problem

##### Beneficial uses of Piper Creek

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health associated with Fish Consumption

##### Use that is impaired

- Protection of Warm Water Aquatic Life

##### Standards that apply

- Standards for Volatile Suspended Solids may be found in the general criteria section of the Missouri Water Quality Standards (WQS), 10 CSR 20-7.031(3)(A) and (C) where it states:
  - Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
  - Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.

#### Background Information

Any waterbody that was listed for Non-filterable Residue (NFR) in 1998, such as Piper Creek, is now being listed for Volatile Suspended Solids (VSS). This change was made to better distinguish between organic solids coming from wastewater treatment plants (VSS) and mineral solids (soil or mineral particles) coming from soil erosion or erosion of mine waste materials or stockpiles (Non-Volatile Suspended Solids or NVSS).

Town Branch of Piper Creek is called Piper Creek on the 303(d) list. This is due to confusion about its location as listed in the WQS and will be corrected as the standards get revised to read Town Branch. The creek was placed on the 303(d) list because it showed an accumulation of objectionable solids downstream from the Bolivar Wastewater Treatment Facility (WWTF) in 1993. Volatile suspended solids refer to particles that are suspended in water, like algae, or those that settle out, like the sewage sludge in Piper Creek. When these solids settle onto the streambed, they smother natural substrates (materials in the streambed), aquatic invertebrate animals (like crayfish and water insects) and fish eggs.

A two-year study by the department of deposition of solids in Town Branch and Piper Creek began in 2003. The portion of the study that characterizes the impacts to the stream related to sediment deposition and organic solids was completed in 2004 (data are shown in the table below). The results do not indicate a VSS impairment due to the treatment plant. However, the bioassessment portion of the studies indicates the aquatic community is somewhat impaired due to the WWTF. The sediment study reported heavy growth of close-growing algae both up and downstream of the plant indicating the WWTF is not the only source of the impairment. The TMDL will need to identify other possible sources of nutrients (the likely cause of the excess algal growth). This could include fertilizer from lawns and cattle in the stream, among other things. The local community within the Town Branch watershed is being engaged through public meetings to find a way to remediate the problem(s). The bioassessment study recommends the use of best management practices inside and outside of Bolivar city limits of to help control nonpoint source pollution. The studies are being rerun (2005) to clarify (agree or disagree with) the sediment results.

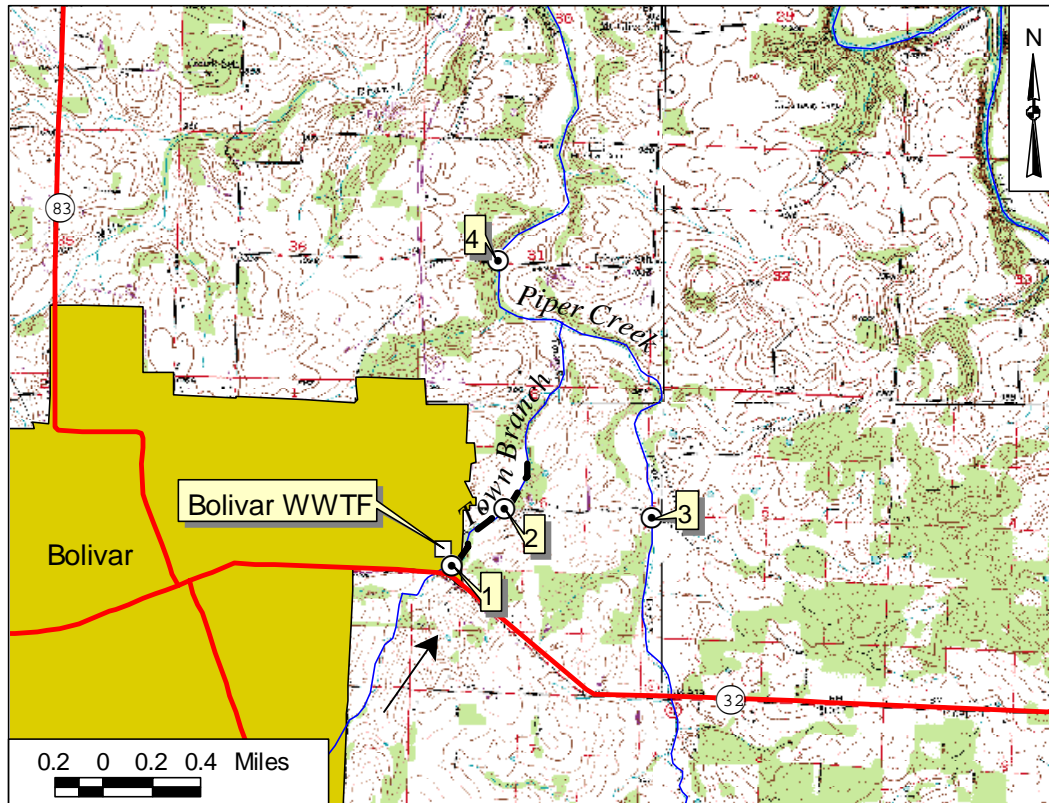
**Results from the First Year of the “Sediment” Study  
March and May 2004**

Site	Year	Month	Day	BOD	TSS	VSS	% of Fine Sediment Deposition
1	2004	3	23	46	1520	160	67
1	2004	3	23	70	2110	250	
1	2004	3	23	61	1670	160	
1	2004	5	11	21	1150	128	90
1	2004	5	11	42	1060	128	
1	2004	5	11	52	2700	320	
2	2004	3	23	69	2730	250	78
2	2004	3	23	69	1870	320	
2	2004	3	23	69	2080	330	
2	2004	5	11	80	124000	2930	78
2	2004	5	11	47	47200	1530	
2	2004	5	11	53	13200	880	
2	2004	5	11	41	4740	540	
3	2004	3	23	69	7760	670	87
3	2004	3	23	50	860	85	
3	2004	3	23	67	11200	880	
3	2004	5	11	32	25100	330	49
3	2004	5	11	31	1620	176	
3	2004	5	11	40	32000	1860	
4	2004	3	23	60	1410	210	17
4	2004	3	23	69	2390	250	

4	2004	3	23	48	352	76	
4	2004	3	23	69	1120	200	
4	2004	5	11	36	3680	330	18
4	2004	5	11	42	5300	176	
4	2004	5	11	30	23400	1860	

Note: Spearman Rank Order Test and Kruska-Wallis One Way ANOVA tests indicated no significant difference between any of the sites for Biochemical Oxygen Demand, Total Suspended Solids or VSS.

### Impaired Segment of Town Branch of Piper Creek in Polk County, Missouri



----- Impaired Segment      —————> Direction of Flow

#### Site Index

- 1-Just upstream of Bolivar WWTF outfall
- 2-Approximately 0.33 mile downstream of WWTF
- 3-Piper Ck. approx. 1.2 miles upstream of Town Br. at 435<sup>th</sup> Rd.
- 4-Piper Ck. approx. 0.44 mile below Town Branch at 425<sup>th</sup> Road

#### For more information call or write:

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